

Face authentication system based on FDA and ANN.

ABSTRACT

Face authentication systems (FAS) are still in their infancy and many types of algorithms and techniques have been proposed to improve the ability of these systems. Artificial Neural Networks (ANN) have been commonly used as the classifiers for FAS whereas Fisher's Discrimination Analysis (FDA) has been used widely as the feature extractor. However, many current FAS still experiencing low accuracy rates using these techniques due to factors such as illumination, orientation and other disturbance. The purpose of this paper is to investigate the application of photometric normalization, linear subspace feature extraction, and ANN classification in enhancing FAS, and to build and evaluate the performance of the proposed FAS based on this approaches. We similarly used the popular ANN classification, namely Multi-Layer Perceptrons (MLP) as the classifier for our FAS as it has proven to be simple for implementation. meanwhile, we proposed linear subspace feature extraction techniques based on FDA to reduce the dimensionality of the face image. In addition, the photometric normalization techniques based on Histogram Equalization and Homomorphic Filtering are used to improve the appearance of the face. The effect of different combinations of the photometric normalization techniques on the performance of the proposed FAS was studied and the effectiveness of these techniques was highlighted. The results of the proposed FAS were compared among Eigenface and Fisherface FAS. It was discovered that using AT&T datasets, the proposed FAS solution outperformed the FAS based on Eigenface and Fisherface in term of False Acceptance and False Rejection rate. Furthermore, the experimental results demonstrated that MLP was able to produce better classification model that can satisfy the model authentication tests with significant advantages over Euclidean Distance, and Normalized Correlation classifier.

Keyword: ANN, face authentication, Fisher's Discrimination Analysis (FDA), Multi Layer Perceptron (MLP)